



CitizenSqKm

An experimental methodology to promote and evaluate the use of community networks for civic engagement

Abstract

CitizenSqKm is a technological, educational, journalistic and civic administration project and an experimentally-driven research on community-owned local networks located in a selected square kilometre.

Its main aim is to benefit the neighbourhood by engaging the wider community in the discovery and improvement of their environment by collecting and classifying data related to it.

CitizenSqKm suggests that anyone who has a mobile device connected to the Internet can create, collect, process and share data massively, geolocatedly and in real time. And by giving data or knowledge the above mentioned ubiquitous attributes of digitised media, citizens will regain ownership over that data, and as such they will have the capacity to have an impact on their environment, which will empower them. For that to occur users will need to have a mobile device connected to other users and ideally this connection will be open and free, such as that provided by network communities.

The project includes strengthening the community network of the selected quarter; developing a geolocation platform; designing a comprehensive qualitative and quantitative methodology of assessment; and implementing a communicative ecology with wider local community. The result, which can be re-packaged and adapted elsewhere, is a platform and a methodology for community engagement and participation, with guides for specific activities, and a research methodology to measure social interaction among participants.

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1. Introduction

The main aim of CitizenSqKm is to benefit the neighbourhood by engaging a **community network**, made up of students, local administrations and local entities, in the development of their own community using geolocation technologies, based on a commons based **computer network** (guifi.net)

The local community network, promoted by the project core researchers, actively participates through pedagogical and *ludic* (play) experiences, in the discovery and improvement of the neighbourhood by collecting and classifying data related to it, by creating geolocated layers of relevant information and itineraries.

A map has been created for people to make an inventory of the “things” in the neighbourhood; like institutions, commerces, historic buildings, plants, temperatures, etc.; with the aim to overcome and better manage the information linked to the territory and classified by author, source and topic. Participants conduct a census of the land, its inhabitants, its infrastructures, its services, its history and its nature and as they do so they take full advantage of data already collected by the inhabitants and open data coming from public administrations and sensors. This process of ‘civic reappropriation of data’ engages citizens and local administrations in the development of their own community.

A methodology has been developed to observe and measure the interactions among individuals, through Social Network Analysis (SNA) and also their interests, those of the individuals and those of the organisations, applying Content Analysis Techniques, so it can later identify change, if change occurs.

The goal for this experimentation is to contribute to increase public awareness about the potential of collecting data, local content and sharing knowledge, and to contribute to build and strengthen the community network of the selected quarter thanks to the deployment of a commons based computer network infrastructure and training and empowering citizens to work collaboratively in activities that improve the neighbourhood. And to make CitizenSqKm a model to be reproduced and applied to other communities elsewhere, worldwide.



2. Project Background

Due to its ubiquitous attributes, digitized media blur the boundaries between the roles of public administration, journalism, entertainment or educational sectors. Anyone who has a mobile device connected to the Internet can create, collect, process and share data massively, geolocatedly and in real time. All existing media can be translated into numerical data accessible for computers (Lev Manovich, 2001).

For citizens to be engaged and informed it is not sufficient, anymore, to only conduct a simple description and transmission of facts to audiences; the communication process needs to instigate citizens participation, and it needs to be able to influence and help citizens to exchange ideas to create some form of 'democratic debate'.

The goal of this CitizenSqKm's experimentation was to, by using educational methodologies, convert the selected quarter in a model to explore how a community reacts to a new platform where digitised information is created, collected, guarded, processed and disseminated by citizens (students, researchers, volunteers, possibly public officers, entrepreneurs or journalists) in a collective and structured effort. It followed a model of social innovation based on collaborative production by citizens through location based technologies connected to Internet. **CitizenSqKm** used the Confiné concept of Commons (network infrastructure shared and deployed by citizens in benefit of the whole quarter citizen network), and applied this same concept to location based content and data created and shared by inhabitants in the selected area.

CitizenSqKm starting point was on one side, the coordination of a research project conducted by Itinerarium at two secondary schools: Escola Joan XXIII, Bellvitge, Barcelona, and Padre Piquer in Madrid under Fundación Telefónica leadership, demonstrating how service learning combined with mobile location based activities can enhance motivation and improve academic results of students at risk of social exclusion. On the other side, the development of 'Eduloc' (<http://www.eduloc.net/en>); a Geolocation technological platform for a school based learning project and a tool for young students to learn through service learning methods, located narratives and gaming. 'Eduloc' is an active platform that uses mobile devices for teachers, students and families to create itineraries, scenarios and experiences based on location.

CitizenSqKm built on these two previous experiences and took a step further to involve not only students but also civil society, the **community network** of the selected quarter, in a new commons based **computer network**. The pilot has been implemented in Barcelona, where access to the internet (and especially to download or upload media files) is not always available in open spaces.

It created a geolocation platform open to the citizenship to develop a social educational experiment (based on Itinerarium methodology: Adopt, Adapt, Create and Share) to observe and conduct an experimentally-driven research on the community network following Ethnographic Active Research, to demonstrate the



potential of service learning projects based on location, their possibilities to provide a rich and inclusive learning environment for all citizens and to encourage entrepreneurship involving them, actively, in their community, and also offering means of participation to educational networks and local civic institutions, such as institutions for the elders, the youth, migrants, disabled, women, children,.. the development of the arts, new technologies, among others.

CitizenSqKm identifies a square kilometre area surrounding the school and invites local entities and individuals to create points of interest and itineraries on the platform. When someone strolls through the area with a GPS mobile device, these routes are activated and can be explored. Participants will be encouraged to not only to publish information in different mediums (text, audio, video, images) but also to identify elements of the neighbourhood which need to be fixed or improved, and design emotional experiences for visitors by introducing game elements.

This CitizenSqKm is a longitudinal research study of the designing, developing, implementing and uptake of the platform, and it explores to what degree geomeia tools can be active and inclusive, and the qualities and limitations of education and communication when we use these tools.

Experiments in Poblenou drew on both, Itinerarium's project learning educational methodologies and the Ethnographic Action Research (EAR) methodology, designed for Information and Communication Technology (ICT) initiatives, that combines research with project development, in a multi-disciplinary study. The guiding research question is: "How does CitizenSqKm allow for new and contemporary notions of networked civic engagement?"

Ethnographic and participatory techniques were used not only to guide the research process and action research but also to link the research back to the CitizenSqKm project through the development and planning of activities.

The main objectives of CitizenSqKm project were to convert the selected quarter in a model of how crowd sourced contribution of active citizenship using location based technologies can engage citizens and local administrations in community network developments and enrich the quality of the experience of participants in community networks. To create an open and scalable model, with tools developed for the community, to benefit from the data created by citizens and an opportunity for external researchers to learn more about community networks. It was expected that having a better and deeper knowledge about the local areas would place students in a privileged position, to preserve public property, to improve living conditions, and to make the area a better place.

Different Service Learning projects that arose within the project have already had a positive impact in the quarter, because their main goal was to improve quality of life of the community and produce change wherever possible. The visibility of service learning projects accomplished helped, in its turn, to **increase public awareness about the potential of the community network.**

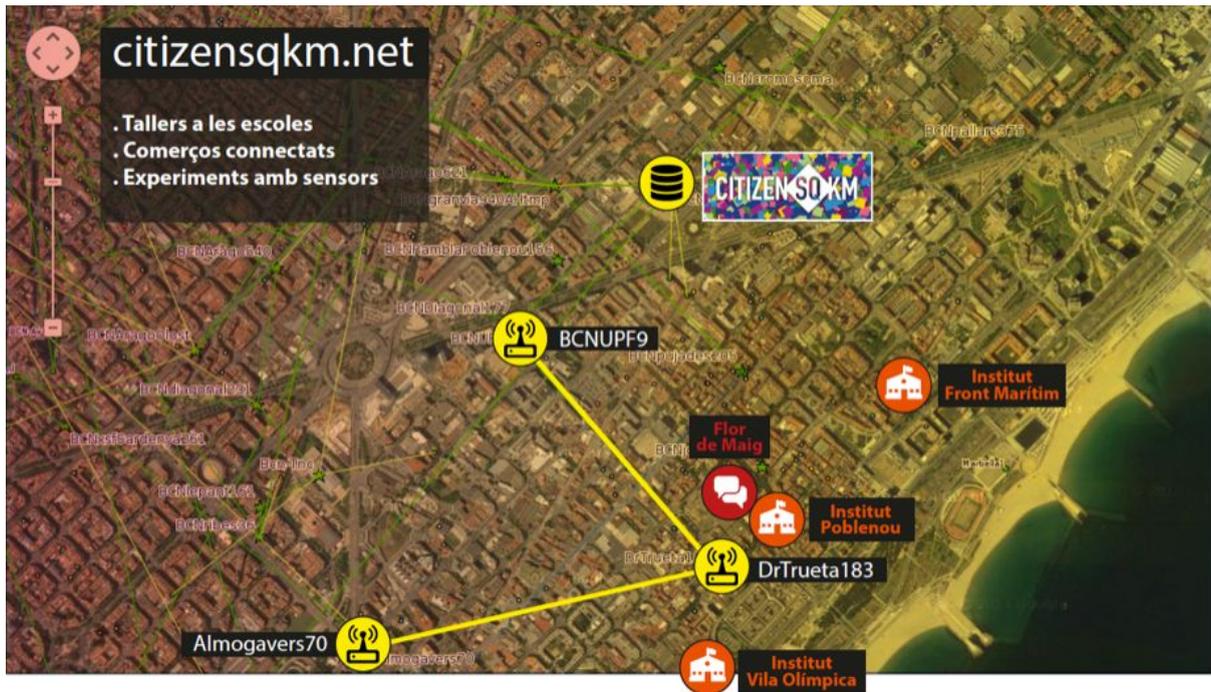


Figure 2: Interactions Map

CitizenSqKm platform was replicated within a guifi.net server, the community network can now offer CitizenSqKm as a service to the community, within the Clomunity Project <http://clomunity-project.eu/> A server with Cloudy distro was installed in the UPC and was connected to the guifi.net network, with the software developed in CitizenSqKm project. Also a mirror server was installed in the [Hangar](#) guifi.net node in Barcelona. CitizenSqKm platform is now accessible via Internet (162.255.119.254) or via guifi.net network (10.139.40.64 and 10.139.94.109, or using a guifi.net DNS server with the same domain).

3.2 - Itinerarium's geolocation platform

Itinerarium's geolocation platform was customized for the project and it also became one more element within a wider communicative ecology with 5 layers of communication: Forum, Geolocation Platform, Social Media, Survey and Community Network access.

Layer 1. The Forum became a space to exchange information and views among participants, to enable social interaction between users, public exposure for the projects and a place to share common resources to strengthen the **network community** links.

A work in progress blog was created in Wordpress (Guide 1).

<http://blog.citizensqkm.net/>, and private Field Notes and emails exchanged were kept. A blog with continuous information about how the project evolves (work in progress) was kept.



Layer 2. The Geolocation Platform (with a web page, and mobile applications for iOS and Android and connected to guifi.net nodes or to the Internet) was created, for data to be copied and shared, infinitely, massively, geolocatedly and in real time. Participants were able to create and access content and data produced by themselves, collected by sensors, or published by public institutions (open data) at the online platform and via mobile applications, from the Secondary School, their own homes, or a mobile device.

Also for the sake of the experiment personal data were collected, kept and anonymised.

Itinerarium's geolocation platform has been customized to enable the exportation of open data, by using data files in KML format, but it needs further development for it to work properly.

Layer 3. Social Media accounts were created and curated.

Layer 4. Survey platform was used to conduct semi-structured online surveys.

Layer 5. Logs between the platform and the community or internet network, measuring data, and interactions among actors and with contents were also established in the geolocation platform.

3.3 - Ethnography and participatory techniques to Adopt, Adapt, Create and Share

CitizenSqKm uses service and project learning as incentive models, with Itinerarium methodology, to encourage users to participate in the community network and at the same time CitizenSqKm becomes a platform at the service of the community network and at the service of the EAR research.

Itinerarium methodology integrates key elements of EAR methodology, for the initiative to be able to be adjusted periodically recognising and responding to local social, political, cultural and economic contexts and to help researchers share, store, manage and analyse data. Researchers will engage the participants, to include their ways of making sense of the world and themselves in their evaluations of projects, following the motto: Adopt, Adapt, Create and Share.

Researchers (social-cultural animators) provided training (talks and workshops) for participants to learn how to take part in CitizenSqKm applying Itinerarium methodology: Adopt, Adapt, Create and Share and to integrate ethnography and participatory techniques.

Having spoken to the community (local associations, shop owners, foundations, NGO's,...schools) and to other projects not related to this community, some participate became active on the platform and others gave advice or participated in some other way.

As the process of creation happened, researchers collected data, reflecting on what they observed and recorded it in the form of field notes, conducting in-depth interviews, short questionnaire-based surveys, and using other tools to



get feedback. The interests and needs of each organisation were recorded, and common interests were actively searched, looking at identifying serendipities. When core researchers did a first approach with the local organisations, they engaged public officers, entrepreneurs, volunteers, researchers, journalists, students, and other citizens (also artists, journalists, activists, cultural workers). For each contacted institution that wanted to support or participate in the project, a Field Note was opened, with the name of the organisation, type of institution; role, email address and name of each member. Later on, the date, the type and the content of each exchange: phone call, one-on-one, face-to-face, online meetings, workshops, note by the researcher, other (which includes blog post) were also registered. Emails exchanged between participants and core researchers were also kept.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Organizati	Institution Type	Role	ID_Indicators_Tal	Name of person of contact	Date DD/MM/AAAA	First Contact	Phon	Meetin	Work	Email	Note	Other	Content	Keyword:
2	XXX.xx														
3		Public Administration		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA		X						Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
4		Civil Organisation		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA			X					Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXX, XXXX
5		Media Outlet or Organisation		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA						X		Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXX, XXXX
6		Technological Organisation		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA						X		Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
7		Research Institute		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA	X							Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
8		Primary School		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA		X						Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
9		High School		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA			X					Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXX, XXXX
10		Trade Training School (FP		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA						X		Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXX, XXXX
11		University		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA						X		Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
12		Informal Education (Esplai		xxx@xxx.xx	Xxxxx Xxxxx	DD/MM/AAAA	X							Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo . Jhkhgh dpyrby ood adu dyyoyyy dadyuy fpyy f adaoi m d. Ddaax axpdx, dapi od tpuo .	XXXXXX
13		Other													

Figure 3: Field Notes Template

To create the paths of participation there were about 100 institutions directly contacted. Field Notes were filled for 49 of them, conversations held with 140 individuals and notes recorded . A total of 29 interlocutors worked in a technological organisation, 9 in a media outlet, 23 in primary schools, 13 in public organisations, 19 in civil organisations, 11 in high schools, 24 in research institutes, 6 in a university. The geolocation platform had the active participation of 450 users, most of which were students or teachers in schools and high schools. There were 5 Primary Schools, involved: Escola Grèvol, Escola Les Acàcies, Centre d'Estudis Montseny, Escola Vila Olimpica, Escola Voramar and 4 Secondary Schools: IES Salvador Espriu, IES Front Maritim, IES Poblenou, Institut Barri Besós. A survey to actors registered on the platform and to 270 new contacts, mainly institutions in Sant Martí District. In this first wave 94 people (34%) answered the questionnaire. (Guide 2)

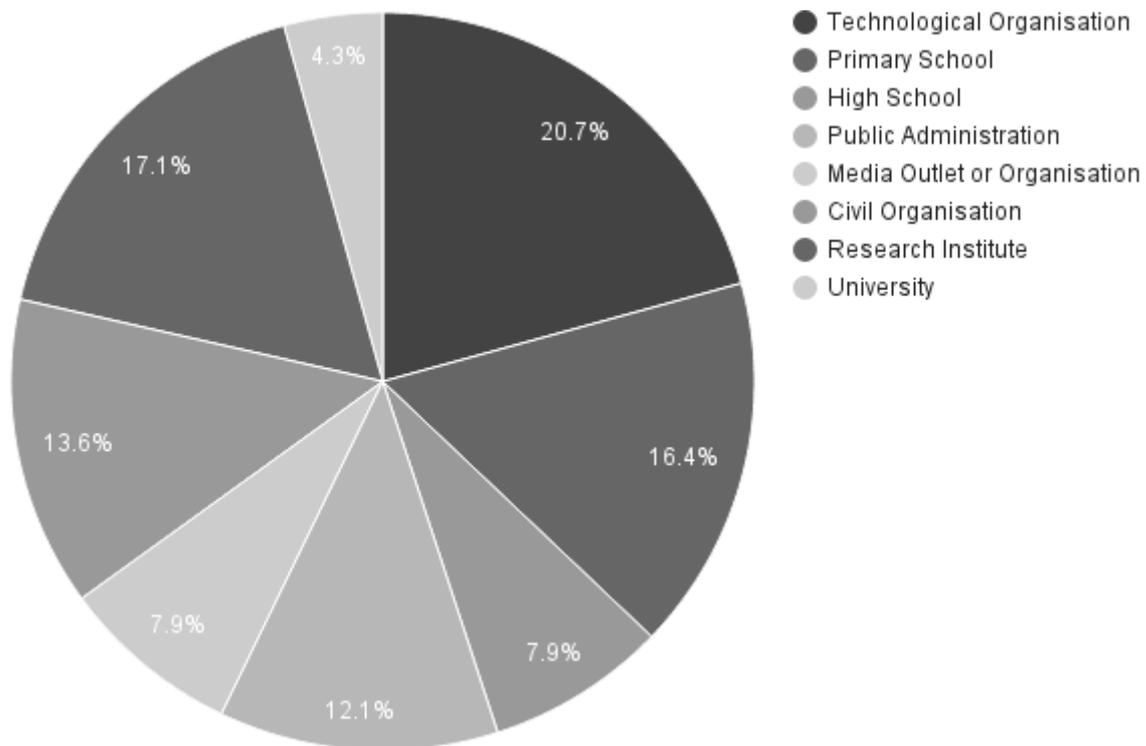


Figure 4: Communicative Ecology of Km2 Poblenou (May 2015)

This community worked together to finding existing projects and common interests among them. The resulting projects and scenarios created can be explored on CitizenSqKm's blog: <http://blog.citizensqkm.net/category/escenaris/>

Two types of collaborative working processes were developed:

Collaborating with organisations or institutions to design a the path of participation, working together CitizenSqKm and the collaborating institution, planning to use the geolocation platform with a specific aim.

Bringing together several projects: where the path of participation was designed by promoting the use of external projects, not related to CitizenSqKm, and geolocating the information collected by them.

Once the different collaborating initiatives were developed and tested, a guide for its replication elsewhere, was produced and published.

1. Collaborating with organisations or institutions

The first step, was for the community to learn to use the technology to regain control over data. Workshops and guides were created, with inputs from guifi.net, the Open Technology Institute of the New America Foundation and with local high schools and primary schools, about how to use the geolocation platform, how community networks function and the potential of collecting data with sensors.

Tutorial to use CitizenSqKm Geolocation Platform and for the project location based main activities to be developed following the Adopt, Adapt, Create and Share



methodology. Students, local civic institutions, and other citizens (elders) were encouraged to participate using the available tutorials on how to use the platform or being part of the workshops prepared for citizens and students to learn to use the platform. <http://blog.citizensqkm.net/tutorials/>

Workshops to Expanding the network were organised, with practical workshop on the extension of a community network (guifi.net) for participants to learn to install an antenna or a router, configure it, and connect it to the guifi.net network.

Guides were prepared with Commotion Wireless a free, open-source communication tool that uses wireless devices to create decentralized mesh networks. Documentation to get started was translated into Catalan and contributed to the Open Technology Institute of the New America Foundation. Guides are published for anyone to access, download, copy and share. (Guide 3)

Together with members of guifi.net in Barcelona, the use of the community network among the community of El Poblenou, was promoted. Workshops for citizens were conducted to learn how the community network functions, to install nodes and to conduct a few experiments collecting data.

<http://blog.citizensqkm.net/dades-en-xarxa/>

A protocol to replicate this workshop **Citizen guide to expand Community Networks GUIFI.NET / qMp** has been prepared and is also shared. (Guide 4)

Citizen guide to create a portable weather station To learn how to create networks of sensors and connect them to guifi.net so that citizens can build small weather stations, creating indexes of air pollution, noise pollution, air humidity, etc. and to identify and compare microclimates.

<https://docs.google.com/document/d/1MmV2-HSIScjC8VfXbLaBlwnO9NbMVD4H82L4KiBwMKY/edit#heading=h.gsbrjrz6k1g1>

Journalistic initiative to geolocate journalistic, current affairs and controversial issues about the neighbourhood, such as its transformation, the growth of tourism, the lack of services, also emerged. Conversations with local and hyper-local media helped create the different layers and categories in the platform and suggested to create a space to keep a calendar, and to have the possibility to merge scenarios with information uploaded by different media outlets, to be able to compare.

2. Bringing together several projects:

Urban Flora and Allergy

Together with scientists at the Aerobiological Information Point (Autonomous University of Barcelona), a path to geolocate and to conduct a phenology of plants in one specific area, was created.

PIA reports on pollen concentration in Barcelona, according to one single sensor in located in the city, help from citizen observation is invaluable to them, and as a



consequence, CitizenSqKm core researchers and PIA experts designed the method to collect the missing information to predict the amount of pollen in the streets using CitizenSqKm geolocation platform.

A **Urban Flora and Allergy Citizen Guide** was created and is available. (Guide 5)

Biodiversity

Experts say that biodiversity in Barcelona shouldn't be observed only to avoid pollen, but we have a very rich urban biodiversity and the majority of animals found in the city are and wildlife are protected.

Several schools and high schools in the neighbourhood were already doing school outings to explore the biodiversity near the city, and suggested to instead explore the inner city urban biodiversity by geolocating it.

A **Citizen guide to create a Local Census of Urban Biodiversity** was created and is available. (Guide 5)

Historical Heritage

For citizens and students to deepen their knowledge on the historical, artistic and cultural local heritage that surround them, collaboration with the local historical archives, public library, and private citizens initiatives was actively searched.

The work of Xavier Badia (a former employee of one of the local high schools) emerged, and his graphic archive collected over 30 years and kept in the form of a PDF, was offered for it to be processed and geolocated. (Guide 5)

CitizenSqKm actively searched the assessment of the local Amical Wikimedia to design a strategy to process the graphic archive following their advice before its geolocation, a Wikiproject was created

https://ca.wikipedia.org/wiki/Viquiprojecte:Fons_gr%C3%A0fic_Xavier_Badia

and the advice incorporated in the **Citizen guide to keep the local historical memory**. (Guide 5)

The Optimal Path

Core researchers spoke to the association of Fathers and Mothers of one school, and to organisations with projects not directly related to the local community of el Poblenou, such as CitiSense, Open Systems, PIA (Point of Aerobiological Information) and Wikimedia.

After seeing how the platform works, each organisation indicated what they would use the platform for. The Association of Fathers and Mothers wanted to use it to geolocate the project "The way to school, friendly spaces" (Camins Escolars, espais amics), a public administration initiative where children going to school on their own, can find safety in local shops which have an identifying sticker on their window. The Point of Aerobiological Information, as explained above, needed help from citizen observation, to conduct phenologies of specific plants. Open Systems needed to test their BeePath phone application to do experiments on human mobility. CitiSense, a project to develop "citizens' observatories" wanted to test their sensors to measure air quality.

Altogether, core researchers and members of the Association of Mothers and Fathers, PIA, BeePath and CitiSense planned for a project to involve citizens

massively, without having to conduct 5 different projects, and the common project was to find which is the Optimal Path to go from home to school or to work and back. maybe Perhaps the best way is he most fun, the safer or the healthier, not the fastest or the shortest.

A **Citizen guide to find 'The Optimal Path'** was created and is available (Guide 5).

These diverse paths of participation, and each element created by a participant, an individual or institution, **were shared** with the whole network to enrich the overall citizen experience. CitizenSqKm project had continuous **activities** to achieve creating a true community network with different stakeholders: teachers, students, their families, local institutions and the administration.

Projects, itineraries, scenarios started to be created and shared via social media.



Figure 5: Sharing projects via social media

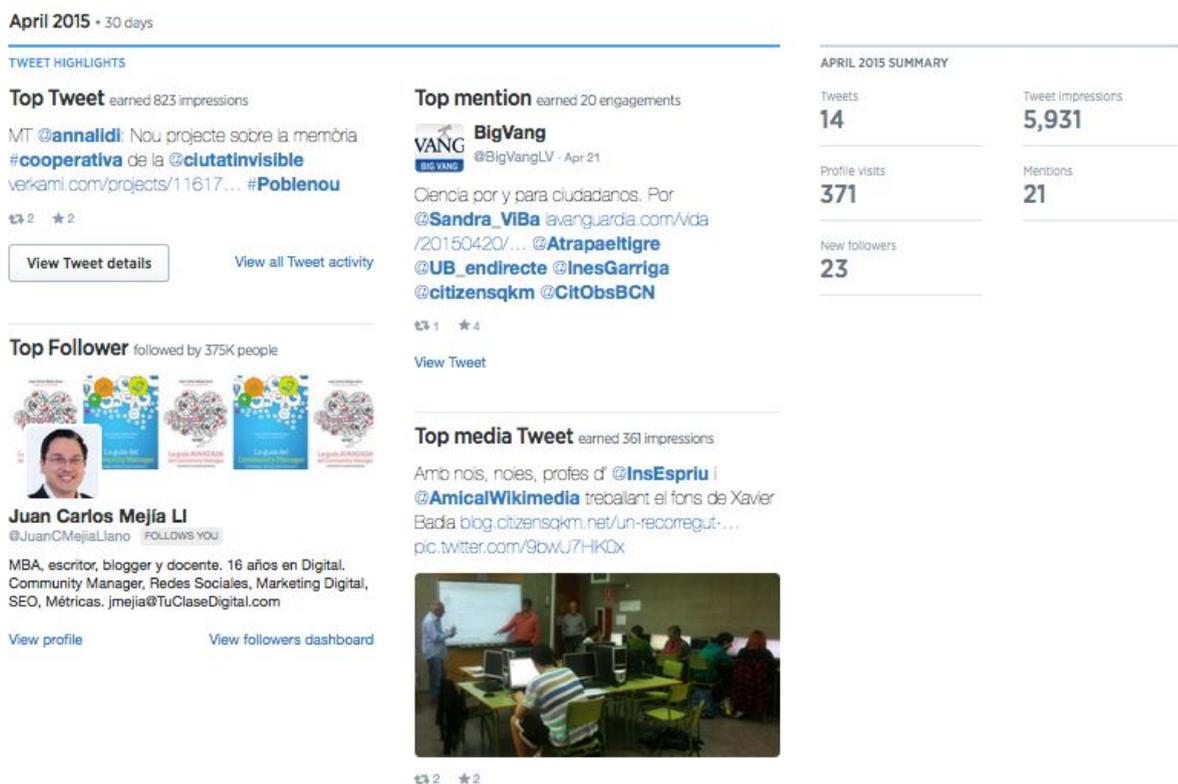


Figure 6: Social Media Analytics

As users designed their paths of participation, engaged their peers, and gathered and published the information on the Geolocation Platform, they were leaving a trail of data that was collected by each of the 5 layers, generating the Communicative Ecology Network Profile. The **Forum** became a space to exchange information and views among participants. The **Geolocation Platform** successfully became a gallery to organise and systematize the knowledge that belongs to the community. **Social Media** accounts (Twitter) were successfully set to become a gallery to conduct a public conversation among the community. **Surveys** deepened in the opinions and views of the participants. The **Community or Internet Network** were also tested as channels through which data travels and is stored.

Research and Participation Methodology

The research project was based on experimentation, designing a comprehensive qualitative and quantitative methodology of assessment based on multilayer analysis, iterative planning and on cyclical evaluation (Guide 6), with a methodology, both for participation and for research, to collect the trail of data left by users as they designed their paths of participation, engaged their peers, and gathered and published the information. Data being collected on 5 layers which form the Communicative Ecology Network Profile (Forum, Geolocation Platform, Social Media, Survey, Community Network)

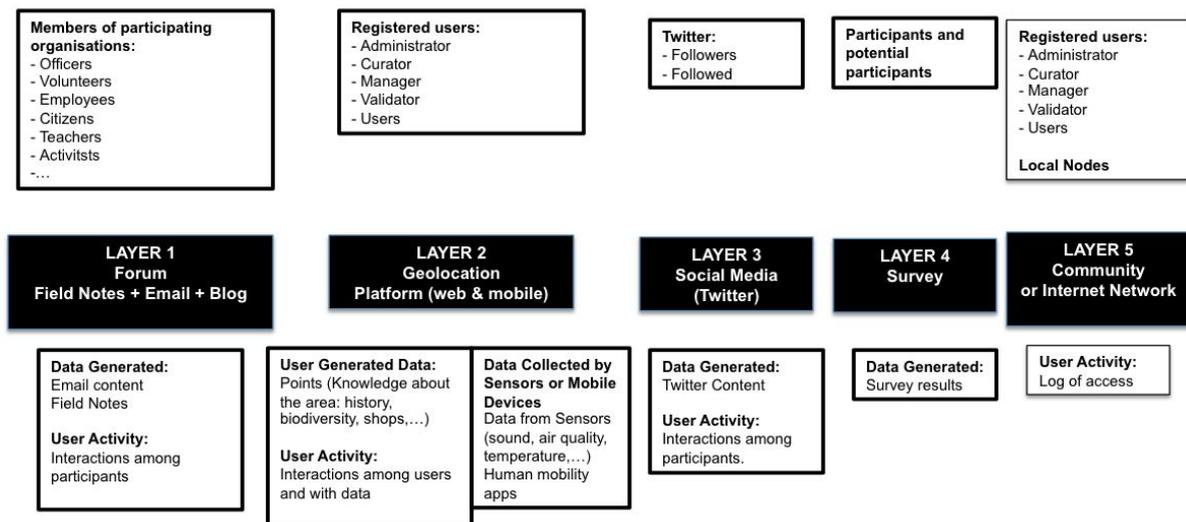


Figure 7: Communicative Ecology (layers)



A database was created:

LAYER 1 (FORUM) Email + Field Notes + Blog + LAYER 2 (Geolocation Platform)		LAYER 3 - Social Media (Twitter)		LAYER 1 - FORUM Email + Field Notes + Blog		LAYER 2 Geolocation Platform		LAYER 4 - Survey		
Mail-anonymized	Code_Name_Personal_contact	Twitter Follower 1	Role within Institution	Institution name (specifically)	Institution Type	Type of Use	Role in the Project	Name on Platform	Id on Platform	Survey
XXXX@ceomontseny.cat	1042	1042	Student/Participant					1042	167	1
XXXX@btv.cat	1045	1045	Journalist	BTV	Media Outlet or Organisation			9999	0	0
XXXX@gmail.com	1052	1052	Volunteer Cultural Engager	Amical/Viquipedia	Civil Organisation			9999	0	0
XXXX@gmail.com	1057	1057						9999	0	1
XXXX@mediainteractivedesign.com	1059	1059	employee IT	FabLab	Technological Organisation			9999	0	0
XXXX@gmail.com	1071	1071						9999	0	1
XXXX@itinerarium.cat	1098	1098	Designer	Itinerarium	Technological Organisation	Professor/Coordinator		1098	66	0
XXXX@gmail.com	1102	1102						9999	0	1
XXXX@	1103	1103						9999	0	1
XXXX@itinerarium.cat	1104	1104	Developer	Itinerarium	Technological Organisation	Professor/Coordinator		1104	96	0
XXXX@xtec.cat	1112	1112	Officer	Consorci Educacio Barcelona	Public Administration			9999	0	0
XXXX@gmail.com	1115	1115	Volunteer Journalist	Associació Catalana de Comunitats	Media Outlet or Organisation			9999	0	1

Figure 8: Communicative Ecology Network Data (May 2015)

Information from Layer 1 is collected in Columns A to E which include the email of the participant, i.e.: ID_indicators_Table - EMAIL 1. Personal information, such as the first part of the email address has been deleted for the sake of anonymity of the participants. A number has been allocated to each participant, i.e.: Participant number: email 1001). The role of the participant in its institution, the institution they are members of and the type of institution is also stated.

Information from Layer 2 is collected in Columns F to I, with the role of each user in the platform, their names have been deleted, for anonymity sake, but their Id number on the platform has been kept. Information from Layer 2, is also collected to describe the type of user: Dynamising Agent; Professor / Coordinator; Student / Participant or Other.

Information from Layer 3 (social media accounts) has also been deleted and substituted by a corresponding Id number (correlated to the ID_Indicator, i.e.: Participant number: twitter 33) in column J.

Information from Layer 4 (survey) has also been given a 0 when the survey hasn't been answered and a 1 when it has, in column K.

Having collected these data will allow for a systematic analysis of the relationships developed among participants and of the content collected and generated on the platform for educational, scientific, journalistic (and any other discipline) projects. The outcome of such analysis will be used in turn, to inform the platform and the educational, scientific, journalistic projects of the community. Consequently, both research and participation in the project will simultaneously observe, measure and enrich social interaction within the community.

4. Main Achievements and Difficulties

The **participation and research methodology** to designing a communicative ecology and methodology will allow to measure the transformative impact that CitizenSqKm may have on its community,

To be able to replicate and escalate the project elsewhere and conduct it in new communities, tutorials, guides, forms and protocols have been created, and they are enclosed in this documentation pack.

The difficulties encountered in the experience in Poblenou and the strategies developed to overcome them, can be useful to inform other future projects in new communities.



Outsiders

Core researchers at CitizenSqKm are outsiders in all of the segments within the community, although the headquarters of the project were located within the neighbourhood when the experiment began, the researchers themselves are not members of any local organisation from the area, they are not part of the public administration, nor the school system, or the local community.

Alliances have been constructed with members of the community, specially teachers and activists, but the time length of the project was too short to strengthen these alliances.

The EAR methodology uses “media itself as a tool for action research: for exploring issues in a community as well as archiving, managing and collecting data and facilitating online networks of EAR researchers.” (Hearn et al. 2009). Local and hyper local media outlets got strongly involved with the project but the timings within their organisations were very slow and there wasn’t enough time to involve participating media outlets with other stakeholders from education and public administration, making the initiative truly multidisciplinary.

Bottom-up

EAR and MSC methodologies were used in triangulation with more conventional techniques to enable participation and to promote a bottom-up flow of information. Despite this, many of the participants approached preferred ‘top-down’ forms of participation, such as direction from the the core researchers of how they wanted participants to contribute to the project, and what actions the participants were expected to undertake, when and for what duration. As a result, in the first stage a more active approach than initially planned was taken to structuring avenues for participation.

CitizenSqKm was obviously breaking the common ecosystem. End-users (citizens, fathers and mothers, scientific researchers,...) welcomed the project. Some middle-users (teachers, journalists, researchers, ...) also embraced it, a few didn’t like it so much. Most institutions (public administration, schools, organisations) couldn’t figure out how to deal with it, they felt it was disruptive. As such, it was observed that individuals, especially those working in institutions, are not used to receive open proposals, they expect to receive clear instructions on what is being asked from them and what is the time schedule. The negotiation, coordination, creation of the paths for participation was very long and costly, the first 6 months of the project were invested into creating the first projects to engage participants. The schedule of the project had to be modified and all stages were postponed.

What community?

CitizenSqKm Confine’s submission stated that its main aim was to “benefit the neighbourhood by engaging a **community network**, made up of students, local administrations and local entities, in the development of their own community using geolocation technologies, based on a commons based **computer network** (guifi.net)”.

Despite the efforts to define the concept of “community’ from the very start, it wasn’t clear to all that ‘community’ referred to the wider community in the neighbourhood, the general community, citizens who do not know what a community network is, and



not the 'community network' itself.

guifi.net initially suggested developing CitizenSqKm's experiment in the Barcelona neighbourhood of El Raval, but soon suggested Poblenou would be a better community to work with for this project. The main reason being the annual event "Tallers Oberts Poblenou", by which Poblenou Sense Fils had committed to provide connectivity to local ateliers

<http://www.poblenousensefils.net/tallers-oberts-del-poblenou/>. Hangar <http://hangar.org/>, a center for arts production and research, set up by the Association of Visual Arts of Catalonia (AAVC), was at the center of the publicly funded initiative, but the project hasn't been delivered yet, and the direction of Hangar hasn't found the occasion to meet with CitizenSqKm's team.

Knowing the Catalan local network community Gufi.net was within Confine and having had first meetings with Confine participants and members of Guifnet; having chosen in conversations with guifi.net.net the specific neighbourhood in Barcelona where the experiment would be conducted, Poblenou; and having conducted a first meeting with Confine participants and the local guifi.net group, Poblenou Sense Fils; it was assumed by core researchers that the necessary communication channels had been established, and support to the experiment from Poblenou Sense Fils was a given. That assumption was wrong and the complexities of guifi.net.net's community, should have been taken into account.

No common goal.

CitizenSqKm researchers' main goal was to find how to extend the community network in a way that the wider community could access it using mobile devices for the sake of the experiment. Gufi.net's community's main goal was to extend the community network's number of nodes locally and strengthen infrastructure and mesh network, "at guifi.net we are agnostic regarding the use, we only want to create network".

Some in the community network considered CitizenSqKm to be "free riders", not giving any benefits and not planning to give any benefits to the community network. The project's budget had funds to buy parts for growing the community network, but it was very difficult to find agreement on first defining what local institutions would participate in the project, if they were schools a permit from public administration was needed, how the experiment would be conducted, to then deploy nodes for the community network taking into account the experiment and also the needs of the community network.

Exchanges happened almost one to one, researchers approached one member of the community network and he would call another member of the community network to ask about CitizenSqKm project, how was it funded and who was behind it. They would have a discussion and get back to the core researchers. When group emails were sent out only few of the receivers would answer.

Finally, 7 months into the project, a member of guifi.net.net recommended researchers to register to the local guifi email list guifi-barcelones@llistes.guifi.net.



That was very well received by members of gufi.net and increased, enormously, the level of collaboration in terms of extending the gufi.net community network locally and developing workshops for schools.

Within the local gufi.net email list, several conversations flourished. The possibility of creating a “simple and popular node with very strict specifications to make it usable for students, shops, cafes, ... something easy and viral for urban environments”, was considered by some within the list, but the idea wasn’t followed up. And also emerged a conversation about what is the community, within a community network, and some gufi.net members were worried the local community might be misled by CitizenSqKm and made believe mobile connectivity from the street would be available, which is something gufi.net do not want to do but other community networks within Confine do offer.

If gufi.net’s mobile node -an open transmission station or wireless telecommunications infrastructure that can be used in the urban space and connected to other digital networks- had been available or a new one had been developed interactions could have been measured, and other observations could have been done. Also experiments with human mobility apps could have been conducted and sensors could have been connected to the mobile node as well.

No common problem to overcome, either.

The EAR approach requires a high level of commitment by organisations, and is easier to apply in developing communities, where there is a prevalence of high need. In communities that don’t require assistance, having a common problem to overcome may work to create the necessary level of commitment.

In the neighbourhood of Poblenou, as elsewhere in Barcelona, Internet connectivity from mobile devices in the street is limited. The community also has problems adopting new technologies, having access to computers and mobile devices, and having access to Internet connectivity and signal strength.

If CitizenSqKm wants to test if it can help citizens feel they can create an impact on their environment, having a mobile device connected to other users, they will need connectivity, ideally provided by network communities.

Researchers in CitizenSqKm assumed they were tackling, together with other members of Gufinet participating in Confine, the problem of poor access to mobile internet connection and use of mobile devices by the community. But as noted above, not all members of Gufinet participating in Confine shared that view. Neither the public administration institutions had an intention to contribute to overcome such issues.

To increase connectivity and install an antenna on the top of a public building, and very especially on a school building, permission from the local administration is required, and the timings for permission are too slow to manage to install a significant number of antennas over the duration of the experiment.



Core researchers in CitizenSqKm also searched for synergies for the community to have access to mobile devices, during the experiment and beyond. Cibernàrium, the programme for IT skills acquisition and diffusion of Barcelona Activa (Barcelona City Council) did have mobile devices for the community but the devices must be used inside the building; the public library could have lend 1 or 2 devices for a specific activity; and the education department could also lend about 10 devices for a specific activity, but not regularly.

CitizenSqKm's wider community (in Poblenou) seems to not have one single uniting problem to fight against, but many small problems that affect sub-communities within, such as: difficulty in communicating to the wider community, issues in education, not knowing the community, too many tourists dilute the community (neighbours don't know each other), lots of disconnected institutions and projects that overlap but ignore each other.

Lack of co-planning and collaborating skills

As noted above, a lack of co-planning and collaborating skills, especially within institutions, was identified. Encouraged by several institutions (Cibernarium, Fablab, Public Library) which expressed their interest in being more involved with the local community, core researchers tried to develop intergenerational projects across institutions, but didn't succeed,

Mapping walks through the area of Sant Martí using images from the historical archive of Poblenou, and promoting work in teams of students and grandparents from Casal d'avis de Can Saladrígues where, with the support of the City Council and financing from La Caixa (local bank), UPC university is training elders in using new technologies. **Mapping shops** participating in the City Council's initiative 'Camins Escolars' (the way to school, by IMEB) with the support of the Barcelona Activa (Barcelona City Council) training of shop owners through Cibernarium.

Mapping local services for older people, an initiative suggested in the very beginning of the project by a local publicly funded institution (Apropem-nos) which at the end of the 12 months of the duration of the experiment and after numerous meetings hadn't produced the list of the services to be mapped.

Where collaboration action has occurred, great success has been recorded, and often it has been thanks to crucial individuals and organisations, such as scientists in research organisations, mothers and fathers as well as specific teachers at schools, activists in local associations, and some journalists.

The challenge of time

The experiment has been successful in setting a model to be replicated in the future. CitizenSqKm is at the right place for its second iteration, to test, replicate and scale it.

The platform had to be adapted for the project. The research had set out to adapt the platform to the needs of the users, and to do that it was necessary to approach a



new community and possible users and explain the potential of the platform without having a properly functioning platform.

It has been difficult but the experiment has managed to effectively adapt the platform taking into account the views of the users in an adaptive planning approach and continuous improvement of the platform. It has succeeded in sufficiently engaging the community and their ongoing projects, for the platform to continue to be used in the future by this community without needing further encouragement.

The necessary guides to replicate the project and all materials produced are open and available for everyone to contribute to them replicate the experiment with a tested methodology.

5. Conclusions

CitizenSqKm is a humble contribution to improve European social platform services, educational models, and to enhance the development of Information and Communication Technologies for local communities. The project contributes to a better governance and policy making in new social practices of innovation; it is already being replicated locally, in three cities in the province of Barcelona; and a possible pilot to be conducted in South Africa is being explored.

CitizenSqKm has been a truly multidisciplinary project, combining **research** teams from public policies, Internet science, ethnography, management studies, law, pedagogy, engineering and computer science, each of them already involved in an interdisciplinary field or frontier research, and developing non-traditional approaches.

From a methodological innovation perspective, CitizenSqKm has been an applied case of social innovation based on geolocated data, adding value to the state of the art in the social science. The analysis has been inspired by the pioneering approach, known as Ethnographic Action Research (EAR), specifically designed for Information and Communication Technology (ICT) initiatives.

EAR's methodology combines research with project development, which has been guided by IGOPnet's expertise and Itinerarium's pedagogical and learning located methodology, tested internationally and renowned for its potential to increase students' motivation and academic results.

The methodology followed was described on a [Paper](#) published at the [8th IDIA Conference](#), the International Development Informatics Association. ICTs for inclusive communities in developing societies, "An experimental methodology to promote and evaluate the use of community networks for civic engagement".

Local community of selected quarter. Encouraged cooperation between different sectors of the population, such as school students and local entities. CitizenSqKm enhances the capability to connect distributed knowledge, skills and competencies, and promotes informational and social inclusion. The project provided the tools and technologies for the local community to engage and collaborate, increasing the degree and quality of the knowledge citizens have about the area of the selected quarter, helping identify and solve common problems.



The project has generated a **citizen driven community of social innovation**, with a strong potential to create not only entrepreneurial attitudes but also employment opportunities among the local youth. This community of innovation will have continuity over time, lead by participating research institutes, neighborhood associations, media outlets and schools; their members, workers, teachers, students, and their families who will be able to follow and modify the guides beyond the development of this project, creating useful and visible impact for the citizens of the selected area.

6. List of Figures and Tables

Figure 1: Active Connections Map

Figure 2: Interactions Map

Figure 3: Field Notes Template

<https://docs.google.com/spreadsheets/d/1YEoTJ9vj61X3Tg137i8Bdhd1I6DEHM66HdkmIS-6YQI/edit#gid=0>

Figure 4: Communicative Ecology of Km2 Poblenou (May 2015)

Figure 5: Sharing projects via social media

Figure 6: Social Media Analytics

Figure 7: Communicative Ecology (layers)

Figure 8: Communicative Ecology Network Data (May 2015)

<https://drive.google.com/open?id=0B-YGXfSUFwBFN1pzeG1LaGEzams&authuser=0>

Tutorials and Guides:

Guide 1: CitizenSqKm's blog: <http://blog.citizensqkm.net/category/escenaris/>

Guide 2: Survey

<https://drive.google.com/open?id=1RFW9YQIO99g5SH82MZXhomK7nRsduYBKkLySwPhvKml&authuser=0>

Guide 3: Commotion Kit Construction in Catalan

<http://blog.citizensqkm.net/tutorials-commotion/>

Guide 4: Installation Guide of Community-connected Wifi Access points at home or at an organization site for non tech-savvy citizens. <http://blog.citizensqkm.net/category/tutorials/>

Guide 5: Tutorials Paths for Participation in CitizenSqKm: Educational, Cultural and Entrepreneurial Guides about 'the selected quarter' as a learning environment according to different methodologies, a guide to empower and engage local entities and to give some advice on how to contribute to economic and social change in 'the area'.

<https://drive.google.com/open?id=0B-YGXfSUFwBFfmVTb2FPSkZLRIdWVE1hLUhRMHhWU1FkeFdBOGk2VkiVaGxvSWZ0dkdKN1U&authuser=0>

Guide 6: "An experimental methodology to promote and evaluate the use of community networks for civic engagement", Mònica Garriga IGOPnet (Universitat Autònoma de Barcelona, UAB) Spain; Esunly Medina Universitat Politècnica de Catalunya, UPC Spain; Narcís Vives Fundació Itinerarium Spain.

<http://www.developmentinformatics.org/conferences/2014/papers/garriga-medina-vives.html>



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Steyn, J., Van Greunen, D. (Eds). (2014). ICTs for inclusive communities in developing societies. Proceedings of the 8th International Development Informatics Association Conference, held in Port Elizabeth, South Africa. Pages 47-62. “An experimental methodology to promote and evaluate the use of community networks for civic engagement”, Mònica Garriga IGOPnet (Universitat Autònoma de Barcelona, UAB) Spain; Esunly Medina Universitat Politècnica de Catalunya, UPC Spain; Narcís Vives Fundació Itinerarium Spain.

<http://www.developmentinformatics.org/conferences/2014/papers/garriga-medina-vives.html>

WP5- Dissemination

5th May 2015. <http://bigdataweek.com/2014/03/07/l-opendata-oberta-per-a-qui/>

21st Oct 2014. Presentation to the School of the Commons in Barcelona, IGOP (UAB)

27th Oct 2014.. Seminar with representatives of 30 schools in the district – we talk about CitizenSqKm and guifi.net. None of the participants knew what a Community Network is.

29th Oct. First workshop by Flora urbana i al·lèrgia at Punt d’Informació Aerobiològica (XAC-UAB). Presentation at CRP (Centre de Recursos Pedagògics – City Council department) de Sant Martí

Nov 2014. Delivery of paper at IDIA’s Conference in South Africa.

Nov 2014. Presentation at Western Cape University

January 2015. Publication of paper at IDIA’s Conference in South Africa.

Presentation Library - within the Office of Citizen Science Barcelona City Council

15 January - Meeting at GuifiLab (Hangar) – presented the platform to guifi.net

26 January 2015- Presentation within BcnLab - Citizen Science initiatives

<http://www.barcelonalab.cat/ca/noticies/la-ciencia-ciudadana-srsquoexplica-es-reivindica-set-projectes/>

7th February 2015 - Piece on TV3 & Canal33 - Catalan national television -

<https://www.youtube.com/watch?v=X2AmKjBv7-c>

9th February 2015 CAPS Infoday Barcelona - Organised by IGOPnet at FabLab.

Presentation with Leandro Navarro. <https://www.youtube.com/watch?v=hPF-bXRuowU>

February 2015- Piece on Revista del Poblenou

March 2015 - Presentation at CREAL to CITI-SENSE project consortium

http://www.creal.cat/en_noticies/386/the-quality-of-the-air-will-be-questioned-by-citizens%E2%80%99-observatories-in-barcelona

17 April 2015- Presentation at Citizen Science Day - Barcelona

http://festivalcti.bcn.cat/ciudadana_post/jornada-barcelona-citizen-day/

18 April 2015- Mentioned by Schools at - 1st STEAM Barcelona Conference - invitation from Barcelona City Council- IMEB - Camins Escolars <http://steambarcelona.org/>

7th May 2015 - CitizenSqKm is one of the 20 projects of Citizen Science that appears in the Barcelona City Council publication “Citizen Science, 20 Projects to Promote the City”

http://issuu.com/bcnlabcienciaciudadana/docs/lilibret_icub_eng_/1

10th May 2015 Escuelas Changemaker Ashoka España. Madrid

<http://spain.ashoka.org/conoce-quienes-est%C3%A1n-reimaginando-la-educaci%C3%B3n>